

**SUFFOLK COUNTY DEPARTMENT OF PUBLIC  
WORKS**

**DIVISION OF SANITATION**

**COUNTY OWNED CAPITAL PROJECT DESIGN AND  
REVIEW GUIDELINES**

(June 26<sup>th</sup>, 2015)

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**SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS**  
**DIVISION OF SANITATION**  
**CAPITAL PROJECTS**  
**GENERAL NOTES**  
**(Revised 6-26-15)**

1. No Construction shall commence until the following conditions are met:
  - A. The contractor shall attend a preconstruction meeting with Department of Public Works representatives.
  - B. A permit to construct and discharge for the waste disposal system (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION) and an approval to construct issued by the Suffolk County Department of Public Works (SCDPW) have been received.
  - C. The contractor has filed all necessary applications with NYSDEC, the Suffolk County Department of Health Services, Suffolk County Department of Public Works, the local town and has obtained all necessary approvals.
2. All sewer construction included in this project shall conform to the latest requirements of the SCDPW's Guidelines inclusive of all revisions and addenda thereto. Unless otherwise approved by SCDPW, all materials shall be American made. In all cases where conflicts exist between the contract documents and the latest revisions of the Specification for Sewer Construction, the interpretation and rulings of the SCDPW shall be binding.
3. Prior to the incorporation of any material or equipment into the work, five (5) copies of shop drawings, catalog cuts, characteristic curves, test results performance data, etc. as may be required by the SCDPW shall be submitted to the SCDPW, Division of Sanitation. No material or equipment shall be incorporated into the work until all required submittals are reviewed and approved, in writing, by the SCDPW.
4. All Sanitary sewer lines shall be laid a minimum distance of 10.0' horizontally and 1.5' vertically below any existing or proposed water main.
5. The contractor shall furnish and install an underground marking tape along all sewer lines, force mains and house connections in accordance with SCDPW specifications for same.
6. The contractor shall determine the exact location and elevation of existing utilities (including existing sewers) by field investigation. The contractor is responsible to determine the adequacy of all existing sewers to accept connection of the proposed work. The Engineer shall be notified of any conflicts between existing utilities and of any inadequacy of the existing sewer lines to properly accept proposed connections and flows.
7. It is the responsibility of the Contractor to restore all areas disturbed by his work, to the condition as before the work commenced.

8. During construction, a representative of the SCDPW must be present to observe and examine the workmanship and materials being incorporated in the project. The Department shall be the sole judge as to whether the construction provided is in compliance with Departmental requirements. At any time during the course of the construction that the work is deemed unacceptable, a stop work order will be issued and any work performed after the issuance of such an order shall not be accepted or approved by the SCDPW. Unapproved work and/or material shall be removed and replaced to the satisfaction of the SCDPW before approval to recommence work will be granted.
9. The contractor(s) shall be responsible for maintaining the construction site in a non-hazardous condition all in accordance with the requirements of the New York State Department of Labor, OSHA and all other agencies having jurisdiction. Unless otherwise approved in writing by SCDPW, the contractor shall erect and maintain adequate fencing around all open excavations.
10. Final approval shall not be granted until all the following requirements are fulfilled to the satisfaction of the SCDPW.
  - A. The system shall be subjected to testing to establish the adequacy of individual components and of the overall system's ability to meet the requirements of the approved contract documents. All acceptance testing shall be performed at no cost to the Department and no acceptance testing shall be performed unless witnessed by a duly authorized representative of the SCDPW. The Department shall be the sole judge as to the adequacy of the items tested and defects shall be correct to the satisfaction of the SCDPW.
  - B. Reproducible "as-built" record drawings of the completed sewage collection system shall be submitted to the SCDPW. "As-builts" must be signed and sealed by a duly licensed New York State Land Surveyor and must supply a suitable permanent record of the exact location and elevation of sewer lines, structures, stubs, house connections, wyes and appurtenances. "As-builts" shall be prepared in accordance with SCDPW Standards for "as-built" drawings for sewer construction and must be ink on mylar or equal drafting media and/or digital, as required by SCDPW. Plans must be in the following coordinate systems:
    - Horizontal Coordinate System: NAD 1983, State Plane, New York, Long Island Zone, US Survey Feet
    - Vertical Datum: North American Vertical Datum 1988  
Elevations of points of control in differing datum must note the original datum and its corresponding elevation and 1988 (NAVD) datum and elevation on plans.
  - C. Reproducible "as-built" record drawings of the completed sewage works shall be submitted to the SCDPW. "As-builts" must include, but not be limited to, site plan, operation and maintenance manuals schematics and elementary drawings of electrical, mechanical and process systems. Drawings must be signed and sealed by New York State Licensed Professional Engineer, and must be ink on mylar or equal drafting media and/or digital as required by SCDPW. Plans must be in the following coordinate systems:

- Horizontal Coordinate System: NAD 1983, State Plane, New York, Long Island Zone, US Survey Feet
- Vertical Datum: North American Vertical Datum 1988  
Elevations of points of control in differing datum must note the original datum and its corresponding elevation and 1988 (NAVD) datum and elevation on plans.

D. A “Certificate of Compliance” for all material, work and equipment incorporated into the project must be submitted to the SCDPW, if needed. The certificate must be attested to and signed by a duly commissioned Notary Public.

11. All material and methods of construction must comply with the Technical Specifications for the Construction of Building Sewer Connections.
12. Testing of Force Main - (Method I or Method II may be implemented):

Method I:

- a) Force mains shall be subjected to a pressure test of two hundred (200) psi for a period of thirty (30) minutes, measured at the lower end of the section. Pumps, pipe connections, gauges and all necessary apparatus will be furnished by the Contractor, and all defective pipe, couplings and fittings will be replaced by the Contractor at his expense.
- b) Then the force main shall be tested for leakage at seventy-five (75) psi for a period of six (6) hours, measure at the lower end of the section. At such pressure the leakage shall not exceed forth-six (46) gallons per inch diameter per mile per twenty-four (24) hours. All necessary pumps, gauges and other apparatus will be furnished by the Contractor. In the event that the force main fails to meet the leakage test, the Contractor, at his own expense will locate and repair the defective pip or joints until the leakage is within the allowable limit.

Method II:

- a) Force mains shall be subjected to a pressure test of two hundred (200) psi for a period of two (2) hours measure at the lower end of the section. At such pressure there shall be no leakage loss. All necessary pumps, gauges and other apparatus will be furnished by the Contractor. In the event that the force main fails to meeting the leakage test, the Contractor at his own expanse will locate and repair the defective pipe on joints until there is no leakage loss.

13. Structural Design Requirements – All structural requirements should be incorporated on the construction plans. These details include reinforcing bar sizes and lengths, concrete wall thickness (minimum 15”) and corner details. Any design detail requirements, such as above, not

incorporated in the design drawings will have to be provided prior to construction. If design details are provided by a contractor, they must be reviewed and stamped by the professional design engineer.

14. All pumping stations shall have a prefabricated concrete or a masonry block building which will be used to house the control panels, and if required by SCDPW, the emergency generator. Heat and/or air conditioning shall be provided as required for the equipment.
15. Unless otherwise approved by SCDPW, all pumping station control buildings will be required to be equipped with an odor control system for the operation of the pump station/force main.
16. MPT plan required for installation in any public ROW paved areas.

### **MARKING TAPE NOTES**

#### **A. SCOPE**

The contractor shall furnish and install an underground marking tape along all sewer lines, mains and house connections.

#### **B. MATERIALS**

The material shall be solid plastic tape with a minimum thickness of 4.5 mil. The tape shall be resistant to alkalis, acids and other destructive elements. The tape shall be green in color, 3" minimum width, marked with the words, "**Caution-Sanitary Sewer**". The warning shall be repeated every 16" – 36".

#### **C. INSTALLATION**

After partially backfilling and leveling the trenches to a height of 18" – 24" above the crown of pipe, the roll of tape shall be mounted on a wheel and spread above the prepared surface as straight as possible. The tape shall be held in position by adding backfill with hand shovels before using mechanical equipment to finish the back fill.

If the sewer line or house connection does not end into a manhole, the tape shall be extended at least three (3) feet beyond the plugged end of the line.

**SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS**  
**DIVISION OF SANITATION**  
**ENGINEERING SECTION DESIGN CHECKLIST – CAPITAL PROJECTS**  
(06-26-15)

**I. GENERAL REQUIREMENTS**

**1. General Plan**

- a. North arrow
- b. Provide location map
- c. Scale = 1":100'
- d. Provide a plan index
- e. Show and number manholes
- f. Show pipe, diameter and direction of flow
- g. Show lot #'s, building #'s, etc. matching file map designation for any "out parcels" to subdivision as such
- h. Show house/building sewer connections
- i. Show utility mains
- j. Show soil boring/test hole location and groundwater elevation
- k. Plan size = 24" x 36"
- l. Include SCDPW Capital Projects General Notes and Sewer Marking Tape Note on plan.
- m. Existing and proposed plans must be in the following coordinate system and datum and noted on plans:
  - Horizontal coordinate system: NAD 1983, State Plane, New York, Long Island Zone, US Survey Feet
  - Vertical datum: North American Vertical Datum 1988
  - Elevations of points of control in differing datum must note the original datum and its corresponding elevation and 1988 (NAVD) datum and elevation on plans.
- n. MPT plan required for installation in any public ROW paved areas

**2. Sewer Plan & Profile**

- a. Show general plan requirements, except as otherwise required herein
- b. Show plan over profile scale = 1" 40' horizontal, 1":4' vertical; or 1":50', 1":5'
- c. Show pipe length, type, class and slope
- d. Show stationing of manholes and house/building sewer connections at mainline sewer, stationing to be from downstream to upstream, include match lines where appropriate, and where sheet continuation can be found
- e. Show manhole rim and invert elevations in plan & profile
- f. Label all utility crossings on plan & profiles. Include a crossing data table with bottom/top of pipe inverts and vertical separation distance.
- g. Show water mains and water services (incl. domestic services and firelines)
- h. Show both existing and finished grades

II. SPECIFIC REQUIREMENTS - (also see detail sheets, appropriate SCDPW specifications and Ten State Standards)

1. Manholes

- a. Minimum diameter is 4.0'; where a internal drop assembly required minimum diameter is 5.0'; must conform to ASTM C478 latest revision.
- b. Minimum of 0.1' difference between incoming and outgoing pipe inverts.
- c. Inverts greater than 2.0' difference, provide a drop assembly; drop pipe diameter = lateral pipe diameter + 2"
- d. Provide Type "F" adjustable frames and covers
- e. When finished grade is below +5.50 elevation, provide watertight cover and provide an above ground vent assembly when watertight cover is installed on a flush manhole
- f. Cores on existing manholes must be 1' above or below joints

2. Pipe

- a. Minimum cover over pipe is 4.0'
- b. Minimum diameter mainline sewer = 8", house/building connection = 6"
- c. Mainline sewer at a depth of over 15' must be a minimum of DR-18 class.
- d. Minimum slope for mainline from flush manhole to next manhole is 0.6%

3. House/Building Connection

- a. One 6" connection line for each individually owned unit on single and separate lot. Separate 6" min. connection line for first floor and another 6" min. line connection for all other floors. All connections lines to be properly sized for units served ( rental apartments, multi-unit condominiums and townhouse buidings and office buildings only). Minimum slope is 2.0%.
- b. Direct connection to manhole permitted for industrial/commercial connections only.
- c. Provide an external cleanout assembly located at the face of the building.

4. Force Main (also see pump station guidelines)

- a. Minimum diameter is 4"
- b. Minimum cover is 4.0'
- c. Minimum class is DR-18
- d. Provide a cleanout assembly at 400' max. intervals and at > 45° change in line
- e. Provide drain manhole at low points
- f. Provide air relief chamber at high points
- g. Provide pipe, fittings and valves in class sufficient to accommodate testing requirements

5. Pump Station (also see pump station design guidelines)

- a. Provide positive site drainage
- b. Provide pre-fabricated concrete control building by Shelter Technologies, or equal
- c. All areas within the pump station fence line must be paved



6. Instrumentation & Process Control

- a. The following instrumentation shall be provided:
  - pH/ORP sensor. Desired location is the influent wet well or location where caustic soda is added. Provide logic to control chemical feed pumps
  - Sludge blanket meter in each SBR and/or applicable process tanks determined by SCDPW O&M.
  - Turbidity meters to be installed prior to any final filtration system.

7. Emergency Power System

- a. Sized to handle full plant load with 3 day fuel supply. (Ideally natural gas; then propane; then diesel).
- b. Design includes a portable generator connection.
- c. All components necessary to connect the generator control system to the SCADA System to be provided (Modbus controller, if needed).
- d. Genset – 130°C temperature rise.
- e. Genset starting KVA roughly 3 to 4 times nominal run KW.
- f. Engine KW output shall exceed nominal Genset KW rating.
- g. Design for single pump start at not more than 20 per cent voltage dip or two-pump start at no more than 35 per cent with lights and heat as pre-loads, whichever requirement is more restrictive.
- h. Generator controller and transfer switch should have run relay and auxiliary contacts or equivalent for owner's use to allow status signaling.
- i. Generator set alternator should use permanent magnet generator excitation.
- j. Generator submittal during shop drawing process should include a loads report summary showing voltage dips.

8. Telecommunication System

- a. Provide telephone service inside a 4" PVC Sch. 80 conduit. Number of lines to be coordinated with house phone, alarm dialer unit, control panels and fire alarm system, if applicable.
- b. Provide Cablevision internet service inside a 4" PVC Sch. 80 conduit for SCADA use.
- c. Pull boxes shall be used if distance is greater than 400-feet

9. Treatment System Control

- a. Redundant PLC control to operate in a primary/secondary sequence. In the event of failure of the primary PLC the system should automatically switch to the secondary processor. All auxiliary systems of the control panel including HMI and SCADA connection should operate as they were on the primary PLC processor.

10. Tank Overflow Protection System

- a. Each tank shall be provided with a non-mercury "high-high" level float connected directly to an Ademco Alarm Dialer.

11. Security System
  - a. Provisions provided for installation of CCTV System, coordinate with O&M regarding location of cameras.
  - b. Space to be provided in Lab/Control room for installation of security system monitor.
  - c. If facility has an MCC/electrical room provided ample space for CCTV control cabinet. If no MCC/electric room, provide ample space in lab/control room.
  - d. Provide conduit with drag wire for 120 volt power and computer network to proposed location of CCTV control cabinet.
12. SCADA System
  - a. Shall be compatible with Outpost 3.
13. Freeze Protection
  - a. All piping exposed to the elements shall be heat traced and insulated.
  - b. Pipe to be painted in accordance with applicable SCDPW painting prior to installing heat trace and insulation..
  - c. Heat Trace Controls are to be Thermon SST-2 Freeze Protection Thermostat.
  - d. Alarm output from Heat Trace Controllers to be displayed in central location and/or to the Ademco unit.
14. Control Panel General Requirements
  - a. All Control panels shall be provided with UPS.
  - b. Interior power outlets used to supply UPS devices shall be non-GFCI type and shall only supply power to UPS.
  - c. Convenience/Maintenance outlets if provided shall be separate and shall not affect the control circuitry.
  - d. All control panels shall be provided with network cards with dual capabilities, CAT6 and fiber. Note: CAT6 limited to 300-feet. Any runs over 300-feet will require fiber wiring.
  - e. All control panels with PLC's to have dial-up modems to permit control panel manufacturer the ability to connect to the control panel for troubleshoot and re-programming. Provide telephone service from telephone panel to each control panel.
  - f. Motors to have time delays to stagger starting by 10 seconds (adjustable) after restoration of power.
  - g. Use a control transformer to protect expensive components such as Multirodes, PLC's etc. even if voltage is 120/208.
  - h. Use a control transformer for all 120-volt control circuits if the service is 120/240, three-phase hot leg delta.
  - i. If a GFCI must be run off the transformer secondary, size the transformer appropriately and fuse the circuit (plus CB) so that it cannot draw more than 80% of the transformer's rated current
  - j. For 120/208-volt applications, do not put GFCI receptacles on a control transformer secondary. Tap off the primary side with appropriate overcurrent protection and conductor sizing.

- k. Emergency stop switches located either on the control panel or remotely shall be lighted. The control panel shall display an alarm when the emergency stop switch is activated on the HMI and the location of the emergency stop switch activated.
15. Fire Alarm System
- a. If provided ensure two telephone lines to alarm panel.
  - b. If facility has alarm system provide knox box with dual keys (SC Fire Marshal and Local Fire Department).
16. Electrical System
- a. All outdoor mounting hardware must be Stainless Steel.
  - b. Conduit through concrete slabs or walls must be PVC-coated galvanized. All other conduit buried or exposed is to be PVC SCH 80.
  - c. Service cable to USE-2 THWN-2 or other PSE&G approved 90 °C (wet) wiring.
  - d. See DPW standard detail for submersible cables leaving enclosed tanks and wet wells.
  - e. Add TVSS to electrical service.
  - f. Isolated pits are Class I/Div 2.
  - g. Panelboards should use copper bus with bolt-on breakers
  - h. Safety switches should be used at pumps if the wet well cannot be viewed from the pump panel. Note that 2002 NEC has tightened up language on this issue relative to 1999 Code.
  - i. Pipe sleeve or conduit for permanganate solution tube must be sealed so that gases from wet well do not enter building. A sump that permits grouting of one end of the conduit is an example of this.
  - j. If a GFCI must be run off the transformer secondary, size the transformer appropriately and fuse the circuit (plus CP) so that it cannot draw more than 80% of the transformer's rated current.
  - k. For 120/208-volt applications, do not put GFCI receptacles on a control transformer secondary. Tap off the primary side with appropriated overcurrent protection and conductor sizing.
  - l. Emergency stop located in MCC units shall be lighted and shall connect to the respective control panel indicating activation of the emergency stop switch at the MCC.
  - m. Provide Arc Flash labeling in accordance with the NEC and SCDPW requirements.
  - n. Provide PSE&G interrupter current at the main electrical meter.

**NOTE: SANITARY SEWER DESIGN PLANS MUST BE SIGNED AND SEALED BY NYS LICENSED PROFESSIONAL ENGINEER.**

**SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS**  
**DIVISION OF SANITATION**  
**STP ENGINEERING REPORT REVIEW LIST**  
**(REVISED 6-26-15)**

**DESIGN FLOW:** Use SCDHS Design Flow Numbers.

1. Calculate Population Equivalent (PE)  
75 gpd/person
2. Calculate Peak Flow Factor (PF) as per Ten State Standard.  
$$PF = \frac{18 + \sqrt{P}}{4 + \sqrt{P}} \quad P = \text{Population}/1000$$
3. PF is used to size Influent Pumps to plant from Influent Pump Station (minimum 2 Pumps).
4. Influent S.S. Concentration 320 mg/l (0.20#/day/PE).
5. Influent BOD Concentration 272 mg/l (0.17#/day/PE).
6. Influent Total Nitrogen 65 mg/l.

**EQ TANK:**

Sized to hold minimum 20% of ADF (Average Daily Flow). Ideally sized to 25-30%. Divide tank into 2 sections with connecting pipe (min 12"Ø) with valve.

**STATIC SCREEN:**

Influent Pumps to pass flow thru screen situated above sludge holding tank. Screen must be rated to handle both influent pumps in operation. Screen must be all S.S. construction and screen openings must be 60 mil (0.06 in.)

**SBR TANKS:**

Minimum of 2. 3:1 length to width ration. Sized for 24 hr. retention at Low Water Level. LWL minimum 10' (ideally 12'). Minimum 18" Freeboard ht. – (ideally 2'). Cycle time min. 4.8 hrs. during normal operation for 5 cycles/day/tank. 4 hr. cycle time during storm flow condition for 6 cycles/day/tank. HWL to LWL depth determined by processing 1.7 ADF w/one tank out of service – 4 hr. cycle.

**DECANTER WEIR:**

Length determined by Volume needed to decant over 45 minute period (45 minutes is during storm mode – 60 minutes normal operation). Allowable rate over Weir is 20 cf/min/L ft. of length. Decant volume is HWL – LWL (usually between 3' to 5').

**SLUDGE HOLDING TANKS:**

Minimum 2, sized to hold sludge between 15 and 30 days (ideally 30 days). Sludge content in wasted sludge from SBR tanks is 1 to 2 % (usually 1 %).

1. Sludge wasting pumps sized to handle sludge produced/cycle within ten minutes.
2. Sludge supernatant decant pumps sized to pump 90% of sludge tank within 60 minutes. Sludge tank decant must be piped back through static screen.

#### INTERMEDIATE EQ TANK:

Minimum 2 pumps used to hold SBR tank effluent before pumping to final filters (polishing filters).

1. Final filters are not required but are used to increase leaching rate from 5gpd/sf to 10 gpd/sf. Minimum 2 filters. Each filter must be sized to handle flow from intermediate EQ Tank Pump at a loading rate of 5 gpm/sf (if sand filters used). If filters are continuous backwash, then a float switch (or equivalent) must be installed to shut down when no forward flow. Filter must be all S.S. construction. Purestream or ABS microfilters are allowed in place of sand filters.

#### EFFLUENT EQ TANK:

Only needed if gravity flow from filters cannot be achieved. Minimum 2 pumps. Must handle max flow from filters.

#### LEACHING FIELD:

Ideally open beds. Not usually used because of NYS set back requirements. DPW requires shallow pools (4' effluent depth – 6.5 max depth) at 200% of ADF if beds cannot be used. If plant has final filters – leaching rate is 10gpd/sf sidewall area – no filters, 5gpd/sf sidewall area. Pools are installed in rows (ideally 10 pools/row) with connecting pipes. Pool rings can abut each other. 8' minimum between rows. See Leaching Pool Standard.

#### AIR REQUIREMENT:

EQ Tank, Sludge Tanks, SBR Tanks. Follow Ten State Standards on design of blowers and minimum air.

#### GENERAL:

Provide an overall hydraulic profile and site plan. Site must include property tax map boundaries, access road, fencing around entire site, 100% plant expansion area, 200' radius from STP to buildings and 150' radius from STP to property line and 25' buffer from pools/beds to property line.

#### GENERATOR:

Sized to handle full plant load with 3 day fuel supply. (Ideally natural gas, then propane, then diesel). Designed to include a portable generator connection. All components necessary to connect the generator control system to the SCADA System to be provided (Modbus controller, if needed).

#### INFLUENT PUMP STATION:

1. See Pump Station Design Checklist (Building and Generator not required).
2. PF used to size pumps
3. 2 pumps minimum (both sized for PF)

#### TELECOMMUNICATION SYSTEM

1. 4" PVC Sch. 80 conduit to be provided for installation of telephone service
2. 4" PVC Sch. 80 conduit to be provided for installation of internet service for SCADA use.
3. Pull boxes shall be used if distance is greater than 400-feet

#### INSTRUMENTATION:

The following instrumentation shall be provided:

1. pH/ORP sensor. Desired location is the influent wet well or location where caustic soda is added. Provide logic to control chemical feed pumps.
2. Sludge blanket meter in each SBR and/or applicable process tanks determined by SCDPW O&M.
3. Turbidity meters to be installed prior to any final filtration system.

#### TREATMENT SYSTEM CONTROLS:

To have redundant PLC control to operate as a primary/secondary sequence. In the event of failure of the primary PLC the system should automatically switch to the secondary processor. All auxiliary system of the control panel including HMI and SCADA connection should operate as they were on the primary PLC processor.

#### TANK OVERFLOW PROTECTION SYSTEM:

Each tank shall be provided with a non-mercury "high-high" level float connected directly to an Ademco Alarm Dialer.

#### SECURITY SYSTEM:

Provisions for installation of a CCTV System shall be provided, coordinate with O&M regarding location of cameras. Space to be provided in Lab/Control room for installation of security system monitor. If MCC/electrical room provided ample space shall be provided for CCTV control cabinet. Conduit for 120 volt power and computer network connection to be provided.

#### SCADA SYSTEM:

Shall be compatible with Outpost 3.

#### FREEZE PROTECTION:

All piping exposed to the elements shall be heat traced and insulated. Pipe to be painted in accordance with applicable SCDPW painting requirements prior to install of the heat trace and insulation. Heat Trace Controls are to be Thermon SST-2 Freeze Protection Thermostat. Alarm output from Heat Trace Controllers to be displayed in central location and/or to the Ademco unit.

#### CONTROL PANEL GENERAL REQUIREMENTS:

All control panels shall be provided with UPS. Interior power outlet used to supply UPS devices shall non-GFCI type and shall only supply power to UPS. Convenience/Maintenance outlets if provided shall be separate and shall not affect the control circuitry. All control panels shall be provided with network cards with dual

capabilities, CAT6 and fiber. Note CAT6 limited to 300-feet. Any runs over 300-feet will require fiber wiring.

FIRE ALARM SYSTEM:

If provided ensure two telephone lines to alarm panel. If facility has alarm system provide knox box with dual keys (SC Fire Marshal and Local Fire Department).

LISTING OF REQUIRED PERMITS:

1. Building Permit
2. Fire Marshall
3. SCDHS Article 12 Compliance
4. SCDEC
5. NYSDOT
6. Any additional permits required by local town, county, state or federal agencies.

**SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS**  
**DIVISION OF SANITATION**  
**CAPITAL PROJECT PUMP STATION REVIEWLIST**  
**(Revised 6-26-15)**

**SITE:**

1. Need a Control Building (minimum size 10' x 8')
2. Contains Control Panel
3. Contains Odor Control (Potassium Permanganate [KMNO<sub>4</sub>] Feed System) w/min 30 gal drum or tank. Installation not required until odors occur.
4. Lighting
5. Eyewash
6. Heater
7. Wall Vent (Exhaust Fan optional)
8. Need Hose Bib or yard hydrant (for wash down)
9. Lighting (Exterior) (400 W min), meeting local lighting and dark sky regulations
10. Fencing w/No. 6 Gauge Mesh (6' High) and Green Hedge Slats
11. Entire site to be asphalt paved – 2" top course w/6" base.
12. Evergreen trees surrounding fence
13. Access road w/gate
14. Install a PVC conduit from control building to wet well (buried) for future KMNO<sub>4</sub> feed system.

**WET WELL:**

1. Min size 8'Ø w/coved bottom
2. Wall thickness (D + 1") (i.e. 9" for 8'Ø)
3. Top Slab 12" thick - traffic bearing (H-20 Loading)
4. Access Hatch for Pumps (min 36" x 48")
5. Aluminum w/S.S. Hardware (H-20 Loading)
6. Access Hatch for Ladder (min 30" x 36")
7. Aluminum w/S.S. Hardware (H-20 Loading)
8. S.S. Ladder or Fiberglass w/S.S. Hardware. Safety Post and Safety Rail (S.S.)
9. Pump Hoist (All S.S.) - must be permanent
10. Pump Lifting Cable (S.S.)
11. Pump Guide Rail (SCH 40 S.S. 2"Ø)
12. Explosion Proof Light (Incandescent) 200w min
13. Explosion Proof Supply Fan (30 air changes/hour)
14. Limit Switch with secondary bypass switch on Hatch for Fan & Light
15. Exhaust Duct (min 6" Ø) (Min SDR 35 PVC) extended down to 12" above H.W.L. - Gooseneck at Slab
16. Maximum depth 25' (ground elevation to bottom slab elevation)



### PUMPS: (Flygt, ABS or Equal)

1. Sized as per 10 State Stds.
2. Explosion Proof, Tungsten Carbide Seals
3. Grinder if < 3" Ø Discharge (3" Ø or less allowed if 2 ft/Sec cannot be maintained in 4" Ø Pipe)
4. Duplex w/alternate lead/lag
5. Each Pump sized for peak flow
6. DIP Discharge Pipe - if < 3"Ø, Stainless steel SCH 80 w/stainless steel supports and hardware.
7. Quick Disconnects
8. Mix Flush Valve on one pump allowed

### PUMP CONTROL SYSTEM:

#### Components

1. Multismart controller with Multitrode probe
2. Back up Non-Mercury Differential High Water Float (APG Kari 3HE/C3HE – standard 0.75# weight all locations where mat build up isn't expected, 1-1/2 # all other locations)
3. Back-up Non-Mercury Low Level Float
4. Back-up Non-Mercury High-High Float wired directly to alarm dialer
5. Each Pump to have Hand-Off-Auto Switch
6. Each Pump to have Red Running Light
7. Each Pump to have Green Off Light
8. White "Power On" light to be provided
9. Each pump to have yellow overtemp light
10. Each pump to have yellow seal failure light
11. Yellow "Multismart Bypass" light to be provided

#### Primary Control

Primary control shall be thru the Multismart controller using the levels obtained by the Multitrode probe.

#### Back-up Controls

In the event the level reaches the Back-Up Non-Mercury Differential High Water Float, the system should assume that there is a failure of the Multismart controller unit or there is an issue with the Multitrode probe. The pump station control panel should go into By-Pass Mode and operate the station using the Differential High Level Float.

Upon activation of the by-pass mode by the Back-Up Differential High Water Float, the controller should energize pump one (if in the auto position) and at the same time energize an adjustable timer (0-15 minute range). Pump one should continue to operate, until the level reaches the bottom end of the differential high water float range at which point the pumps should shut off. In the event that with pump one energized and the adjustable timer expires, the control

panel shall energize pump two (if in the auto position). If the station contains, more than two pumps, the pattern of energizing an additional pump and an adjustable timer should continue until all pumps are energized or the water level reaches the bottom end of the differential high water float range, at which point the pumps should shut off. If pump one is in the off position, pump two should energize and the logic continue if additional pumps are present.

Once the wet well re-fills to the on level of the differential high water float, the pumps should turn on as described above and repeat the cycle. Once in bypass mode, the control panel shall remain in this mode until manually reset by a push button on the control panel door. Upon activation of the by-pass mode, the control panel shall close a contact in order to provide a dialed out alarm. A light shall be provided to visually indicate that the panel is operating in bypass mode.

In the event the level reaches the low water float, the control panel should close a contact in order to provide a dialed out alarm. A light shall be provided to indicate a low level float alarm.

#### Alarm Conditions Shown at Control Panel (example is a duplex station)

1. Multitrode High Water Level
2. Multitrode Low Water Level
3. Seal Leak, for each pump
4. Motor Over-Temperature, for each pump
5. Pump #1 Failed to Start
6. Pump #2 Failed to Start
7. Low Level Float Activated
8. High Level Float Activated
9. Multismart By-Pass Mode
10. UPS Loss of Power
11. H-O-A Switch not in Auto, each pump

#### Alarm Conditions sent from Pump Control Panel to Ademco Alarm Dialer

1. High Water Float Activation
2. Low Water Float Activation
3. Panel Power Loss, including UPS Loss of Power

#### Other Alarms from the Pump Station to the Ademco Alarm Dialer

1. High-High Float Activation (direct wire)
2. Facility Power Loss
3. Generator Fail to Start
4. Generator Run
5. Generator Battery not correct voltage

(The 3 control panel alarms and the 5 other alarms, would then max out the 8 point Ademco alarm dialer)

#### VALVE CHAMBER:

1. Dezurik Valves or Equal
2. Check Valves (air cushion)
3. Traffic Bearing Slab (H-20 loading)
4. Access Hatch, min 30"x 36" (AL w/S.S. Hardware)(H-20 Loading)
5. Manhole Steps (Stainless steel or steel reinforced copolymer polypropylene)
6. Light (Explosion Proof Incandescent min 100w)
7. Bottom drain w/gravel
8. Provide a 4" quick disconnect after the plug valves for bypass purposes

#### FLOW METER PIT:

1. Magnetic Flow Meter
2. Must be 20 Pipe Ø from all fixtures (or as Manufacturer's specification allows)
3. Access Hatch, min 30"x 30"(AL w/S.S. Hardware) (H-20 Loading)
4. Traffic Bearing Slab (H-20 loading)
5. Chart Recorder (mounted in Ctrl Bldg)
6. Flow Meter Grounding to be per mfg. requirements

#### STRUCTURAL:

1. Wet Well Top Slab
2. 12" thick w/top and bottom steel
3. #4 bars @ 8" O.C.E.W
4. Side Walls: .24in2/LF Mesh min
5. Bottom Slab 8" thick w/T & B Steel
6. #4 Bars @8" O.C.E.W. w/dowels (#4 bars 12" radially)
7. Bottom Slab & Walls to be monolithic to 3" above inlet pipe
8. Two-part epoxy coat interior to 6" above inlet pipe.

#### FORCE MAIN:

1. 4" Ø min (less if 2 ft/sec min velocity cannot be achieved)
2. DR 18 PVC or Ductile Iron
3. Tested to 200 psi
4. Clean out Manhole every 400' or at every bend 45° or greater (see standard detail plans)
5. Thrust block at every bend (see standard detail plans)
6. Min 4' of cover
7. Air release MH at every high point (see standard detail plans)
8. Drain MH at every low point
9. Receiving MH to be two-part epoxy coated
10. Kor-N-Seal or link seal or equal all pipe penetrations into MH's, wet well, valve chamber, Flow meter vault, etc.

### EMERGENCY GENERATOR SYSTEM:

1. Sized to run both pumps, lighting, flow meter, KMNO<sub>4</sub> feed pump, odor control system (if applicable), eyewash heater and any HVAC required to keep the control panels and/or electrical system functioning properly.
2. Fuel supply should be natural gas, if not, then propane, then fuel oil. Must have 3-day fuel storage capacity.
3. If possible, put in Ctrl bldg.
4. Sound enclosure required
5. Portable generator connection to be provided, including all ancillary equipment to permit the connection of a portable generator to the electrical system.

### ELECTRICAL:

1. All outdoor mounting hardware must be Stainless Steel.
2. Conduit through concrete slabs or walls must be PVC-coated galvanized. All other conduit buried or exposed is to be PVC SCH 80.
3. Service cable to be USE-2 THWN-2 or other PSE&G approved 90°C (wet) wiring.
4. See DPW standard detail for submersible cables leaving wet well.
5. Add TVSS to electrical service.
6. Isolated pits are Class I / Div 2.
7. Genset – 130° C temperature rise.
8. Genset starting KVA roughly 3 to 4 times nominal run KW.
9. Engine KW output shall exceed nominal Genset KW rating.
10. Design for single pump start at not more than 20 per cent voltage dip or two-pump start at no more than 35 per cent with lights and heat as pre-loads, whichever requirement is more restrictive.
11. Pumps to have time delays to stagger starting by 10 seconds (adjustable) after restoration of power.
12. Generator controller and transfer switch should have run relay and auxiliary contacts or equivalent for owner's use to allow status signaling.
13. Generator set alternator should use permanent magnet generator excitation.
14. Generator submittal during shop drawing process should include a loads report summary showing voltage dips.
15. Panelboards should use copper bus with bolt-on breakers.
16. Safety switches should be used at pumps if the wet well cannot be viewed from the pump panel. Note that 2002 NEC has tightened up language on this issue relative to 1999 Code.
17. Pipe sleeve or conduit for permanganate solution tube must be sealed so that gases from wet well do not enter building. A sump that permits grouting of one end of the conduit is an example of this.
18. Use a control transformer to protect expensive components such as Multirodes, PLC's etc. even if voltage is 120/208.
19. Use a control transformer for all 120-volt control circuits if the service is 120/240, three-phase hot leg delta. If a GFCI must be run off the transformer secondary, size the transformer appropriately and fuse the circuit (plus CB) so that it cannot draw more than 80% of the transformer's rated current.

20. For 120/208-volt applications, do not put GFCI receptacles on a control transformer secondary. Tap off the primary side with appropriate overcurrent protection and conductor sizing.

#### ALARM DIALER SYSTEM

Ademco alarm dialer system to be used (8 alarm points per unit). If more than 8 individual points are to be dialed out provided multiple Ademco alarm dialers in series.

#### TELECOMMUNICATION SYSTEM

1. 4" PVC Sch. 80 conduit to be provided for installation of telephone service
2. 4" PVC Sch. 80 conduit to be provided for installation of internet service for SCADA use.
3. Pull boxes shall be used if distance is greater than 400-feet

**SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS**  
**DIVISION OF SANITATION**  
**CAPITAL PROJECT STANDARDS FOR RECHARGE OF WWTPEFFLUENT**  
**(06-26-15)**

Recharge facilities shall be designed in accordance with one of the following:

1. Open recharge beds (preferred method).
2. Shallow sub-surface disposal.
3. Deep sub-surface disposal.

All recharge facilities must meet the Department of Health Services buffer distance standards.

**Open Recharge beds:**

- a. Design leaching capacity is 5GPD/SF without polishing filter and 10 GPD/SF with polishing filter based on bottom area.
- b. Install 100% capacity and provide sufficient land for 100% expansion.
- c. Recharge beds shall be divided into 25% sections and valved to allow rotation of beds.
- d. Bottom of recharge bed shall be a minimum of 3.0' above the highest recorded groundwater elevation.

**Shallow Sub-Surface Disposal:**

- a. Design using 8' or 10' diameter leaching rings.
- b. Maximum effective depth per pool shall be 4'.
- c. The total depth of pool shall not exceed 6.67' which includes: 4.0' pool; 0.67' flat, H20, top slab; 0.67 casting and 1.33' earth cover.
- d. Castings to grade shall be installed on the first and last pool and every fifth pool in between. All other top slabs shall have a reinforced concrete cover.
- e. The pools shall be arranged abutting each other in rows with a clear spacing of 8.0' between rows.
- f. Installation of pools must be in a grass area. No pavement, trees, bushes, shrubs or any other obstruction is allowed in or over the leaching area.
- g. Connecting pipes between pools shall be a minimum of 8" diameter and set at a minimum of 6" and a maximum of 1' from the bottom of the pool, except for the influent pipe to the first pool of each row which shall be set directly below the top slab.
- h. 200% of calculated leaching area shall be installed at the time of initial construction of a WWTP.
- i. The number of pools shall be calculated using only side wall area at a rate of 5 GPD/SF without polishing filters and 10 GPD/SF with polishing filters.
- j. Pools shall be valved to allow rotation in 25% increments.
- k. All soils between rows and pools shall be clean sand and gravel, and shall extend beyond the end rows a minimum of 3.0', and below the bottom of each pool a minimum of 3.0'.
- l. All pool bottoms shall be installed a minimum of 3.0' above the highest recorded groundwater elevation.

Deep Sub-Surface Disposal:

- a. Design using all 8.0' or all 10.0' diameter leaching rings.
- b. Maximum effective depth per pool shall not exceed 16.0'.
- c. The total depth of pool shall not exceed 20.0'.
- d. Top slab shall be H2O loading. Dome top may be used provided total depth is not exceeded.
- e. The pools shall be arranged in five pool clusters (a distribution pool with 4 satellite pools) with a minimum clearance between pools of 8.0', edge to edge.
- f. Installation of pools must be in a grass area. No pavement, trees, bushes, shrubs or any other obstruction is allowed in or over the leaching area.
- g. All distribution pools shall have a casting to grade. All other pools shall have a reinforced concrete cover.
- h. Connecting pipes shall be a minimum of 6" diameter and shall have a minimum slope of 1% between pools.
- i. Effluent pipes from a distribution pool shall have an 18" drop tee and be set a minimum of 3" below the invert of the influent pipe.
- j. Effective depth shall be measured from the invert of the effluent pipe of each pool and all pools shall have the same effective depth.
- k. Pipes shall not enter or exit a pool through a dome top. Domes with cut outs will not be allowed.
- l. 200% of calculated leaching area shall be installed at the time of initial construction of a WWTP and 100% additional non-disturbed area shall be provided.
- m. The number of pools shall be calculated using only side wall area at a rate of 5 GPD/SF without polishing filters and 10 GPD/SF with polishing filters.
- n. Pools shall be valved to allow rotation in 25% increments.
- o. All soils between pools shall be clean sand and gravel, and shall extend beyond the outer pools a minimum of 3.0', and below the bottom of each pool a minimum of 3.0'.
- p. All pool bottoms shall be installed a minimum of 3.0' above the highest recorded groundwater elevation.
- q. Soils must be compacted under connecting pipes between pools. Water jetting or puddling will be allowed.

**SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS**  
**DIVISION OF SANITATION**  
**STANDARDS FOR PREPARATION OF**  
**“AS-BUILT DRAWINGS” FOR SEWER CONSTRUCTION**  
(Revised 6-26-15)

General Requirements

1. Plan and profile on 4 Mil Mylar, prepared and sealed by a New York State Licensed Land Surveyor or Professional Engineer under the supervision and approval of the project-consulting engineer.
2. Any disclaimer concerning information supplied by a contractor is unacceptable.
3. The plan and profile shall be clearly marked “as-builts.”
4. A key map tying in the project to a major road intersection.
5. All property lines, lot numbers and section numbers shall be shown.
6. Preliminary As-Builts: Submit two (2) preliminary as-builts indicating mainline distances, invert elevations, and slopes to the nearest hundredth to allow final house connection tie-ins, also show water main, water service, and drainage within 20’ of sewer locations. (Clearly indicate PRELIMINARY AS-BUILT).
7. Final As-Builts: (Clearly indicate FINAL AS-BUILT), submit two (2) paper prints of plan and profile to be submitted that also show water main and water service locations. One (1) print will be returned indicating any necessary corrections. When paper prints are approved, submit one (1) Mylar and, include one (1) AutoCAD drawings on CD (AutoCAD 14 or higher). CAD Drawings to include all identical information shown on Mylar As-Builts. Plans must be in the following coordinate systems:  
  
Horizontal Coordinate System: NAD 1983, State Plane, New York, Long Island Zone, US Survey Feet.  
  
Vertical Datum: North American Vertical Datum 1988  
  
Elevations of points of control in differing datum must note the original datum and its corresponding elevation and 1988 (NAVD) datum and elevation on plans.
8. Size of plans and scales to be same as approved engineering drawings.
9. All sheets of the approved design drawings must be as-builted and sealed by either a L.L.S., P.E., or R.A.



### Specific Requirements

All Items to be shown on plan view. Applicable items to be shown on profile.

1. All stationing shall be along centerline of sewer lines.
2. Begin stationing at major street intersections.
3. Station continuously along centerline of sewer lines.
4. Stationing of branch lateral lines off of mainline shall begin at intersection manhole with an equality station, and branch line stationing shall carry a letter designation i.e.,

Mainline --- 2 + 90 = 0 + 00 (A) --- Branchline

5. The intercept of the street lateral sewer and the house connection shall be stationed. The intersection of the house connection and the property line shall be referenced by right angle offset and stationed. When the house connection terminates at the eight bend, the terminus shall be referenced by “cross-cornering” from the foundation. The length of all house connections shall be indicated.
6. Indicate outline of existing foundations.
7. Number manholes corresponding with approved engineering drawings.
8. All elevations shall be in the North American Vertical datum and so stated.
9. Indicate north on plans.
10. Indicate elevations of all inverts for manholes and rims. Inverts should be designated by W., E., S., and N.
11. Indicate elevations of inverts of house connections at street lateral sewer and at property line. Where risers are installed, indicate invert of riser section.  
Note: Property line (curbline) elevations are to be physically obtained by surveyor/engineer before house connections is backfilled by contractor.
12. Indicate diameter, class and type of pipe for each lateral section.
13. Indicate, by note, diameter and class of house connections.

14. Indicate distance between manholes, percent of slope and direction of flow.
15. Indicate size and locations of all water mains and water laterals. Indicate size and location of all storm water piping, storm water structures, utilities, etc., that are within 20' of sewers or cross a sewer pipe. Provide crossing invert elevation of each when crossing any sewer piping.

**SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS**  
**DIVISION OF SANITATION**  
**ASBUILT REVIEW CHECKLIST**  
**FOR SEWER CONSTRUCTION**  
(Revised 6-26-15)

Project name and number: \_\_\_\_\_

Date of asbuilt review: \_\_\_\_\_

Return this sheet to the Project Supervisor per each asbuilt review date.

**Place a check mark and your initials on each line for each item below. Remember to confirm all pages and views for each item as applicable**

Check for conformance between every sheet \*

Check for conformance between plan and profile views \*

**This is to be handed into DPW with design professional column already checked off and initialed.**

<b>CHECKLIST- Put your initials in box after each item, each submittal</b>		<b>DESIGN PROFESSIONAL (Initials)</b>	<b>DPW (Initials)</b>
1.	Plan and profile on 4 Mil Mylar, prepared and sealed by a New York State Licensed Land Surveyor or Professional Engineer under the supervision and approval of the project-consulting engineer.		
2.	Any disclaimer concerning information supplied by a contractor is unacceptable.		
3.	The plan and profile shall be clearly marked "as-builts"		
4.	A key map tying in the project to a major road intersection.		
5.	All property lines, lot numbers and section numbers shall be shown.		
6.	Preliminary As-Builts: Submit two (2) preliminary as-builts indicating mainline distances, invert elevations, and slopes to the nearest hundredth to allow final house connection tie-ins, also show water main, water service, and drainage within 20' of sewer locations. (Clearly indicate PRELIMINARY AS-BUILT)		
7.	Final As-Builts: ( <b>Clearly indicate FINAL AS-BUILT</b> ), submit two (2) paper prints of plan and profile to be submitted that also show water main and water service locations. One (1) print will be returned indicating any necessary corrections. When paper prints are approved, submit one (1) Mylar and, include one (1) Auto CAD drawings on CD (AutoCAD 14 or higher). CAD Drawings to include all identical information shown on Mylar As-Builts. All CAD drawings must be projected in NAD 83, State Plane, Long Island Zone, U. S. Survey Feet.		
8.	Size of plans and scales to be same as approved engineering drawings.		

<b>CHECKLIST (cont'd)</b>		<b>DESIGN PROFESSIONAL (Initials)</b>	<b>DPW (Initials)</b>
9.	All sheets of the approved design drawings must be as-built and sealed by either a LLS, PE or RA		
<b>SPECIFIC REQUIREMENTS –</b> <b>Applicable items to be shown on profile</b> <b>*All items to be shown on plan view.</b>		<b>DESIGN PROFESSIONAL (Initials)</b>	<b>DPW (Initials)</b>
1.	All stationing shall be along centerline of sewer lines.		
2.	Begin stationing at major street intersections.		
3.	Station continuously along centerline of sewer lines.		
4.	Stationing of branch lateral lines off of mainline shall begin at intersection manhole with an equality station, and branch line stationing shall carry a letter designation i.e: Mainline---2 + 90 = 0 + 00 (A)---Branchline		
5.	The intercept of the street lateral sewer and the house connection shall be stationed. The intersection of the house connection and the property line shall be referenced by right angle offset and stationed. When the house connection terminates at the eight bend, the terminus shall be referenced by “cross-cornering” from the foundation. The length of all house connections shall be indicated.		
6.	Indicate outline of existing foundations.		
7.	Number manholes corresponding with approved engineering drawings.		
8.	All elevations shall be in the North American Vertical Datum 1988 and so stated.		
9.	Indicate north on plans.		
10.	Indicate elevations of all inverts for manholes and rims. Inverts should be designed by N, S, E, W.		
11.	Indicate elevations of inverts of house connections at street lateral sewer and at property line. Where risers are installed, indicate invert of riser section. Note: Property line (curbline) elevations are to be physically obtained by surveyor/engineer before house connections is backfilled by contractor.		
12.	Indicate diameter, class and type of pipe for each lateral section.		
13.	Indicate, by note, diameter and class of house connections.		
14.	Indicate distance between manholes, percent of slope and direction of flow.		
15.	Indicate size and locations of all water mains and water laterals. Indication size and location of all storm water piping, storm water structures, utilities, etc., that are within 20' of sewers or cross a sewer pipe.		

